

Solving for a variable Practice. Page 1

$$\begin{array}{r} 20 = 5x + 1 \\ -1 \\ \hline 19 = 5x \\ \div 5 \\ \hline x = \frac{19}{5} \end{array}$$

$$x = \frac{19}{5} \text{ or } 3\frac{4}{5} \text{ or } 3.8$$

Skills you need...
 ① → Combine like terms, terms are the numbers and variables in an equation. When you combine "like" terms you combine like variables or like non-variables together.
 You can't combine the following $2x + 5$ but you can combine $2x + 5x$ because they both have the variable x .
 You also can't combine the following $x + x^2$ because... x and x^2 are different terms.

* When you use inverse operations to solve for x you need to remember to perform the operation to both sides of the equation to keep both sides equal.

② Inverse operations, use inverse operations to "isolate the variable" on one side of the equation.

for example...

in the problem above the right side of the equation $5x + 1$

was made this way $x \xrightarrow{\times 5} 5x \xrightarrow{+1} 5x + 1$

x was 1st multiplied by 5, then 1 was added.

Logically... to get back to x you go backwards or do the inverse of what was done to create the algebraic expression.
 $5x + 1 \xrightarrow{-1} 5x \xrightarrow{\div 5} x$

2. $100 = 4(x + 5)$ \leftarrow multiply 4 by both parts inside the parentheses.

$$\begin{array}{r} 100 = 4x + 20 \\ -20 \quad -20 \\ \hline 80 = 4x \\ \hline 4 \quad 4 \end{array}$$

\leftarrow use inverse operations to solve for x .

$$4x + 20 \xrightarrow{-20} 4x \xrightarrow{\div 4} x$$

$$\boxed{x = 20}$$

3. $-5x + 95 = 20x - 30$

$$\begin{array}{r} -5x + 95 = 20x - 30 \\ +5x \quad +5x \\ \hline 95 = 25x - 30 \\ +30 \quad +30 \\ \hline 125 = 25x \end{array}$$

\leftarrow combine like terms by using inverse operations *get all the "x" on one side and the non-"x" on the other.

$$\begin{array}{r} 125 = 25x \\ \hline 25 \quad 25 \end{array}$$

\leftarrow inverse operations to solve for x .

$$\boxed{x = 5}$$

4. $\frac{2x}{3} - \frac{x+1}{5} = 1 - \frac{2x-1}{15}$

$$\begin{array}{r} +2x-1 \\ \hline 15 \end{array}$$

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$$\begin{array}{r} \frac{2x-1}{15} + \frac{(5/3)(2x)}{(3)} - \frac{(3/5)(x+1)}{(5)} = 1 \\ \hline \frac{2x-1}{15} + \frac{10x}{15} - \frac{3x+3}{15} \end{array}$$

\leftarrow Make all denominators on the left side the same so the fractions can be combined.

$$\frac{2x-1+10x-3x-3}{15} = 1$$

continued on next page.

#4 Continued:

$$(15) \frac{2x-1+10x-3x-3}{15} = 1 \quad \leftarrow \text{multiply both sides by 15 to "get rid" of the fraction.}$$

$$2x+10x-3x-1-3=15 \quad \leftarrow \text{rearrange the equation so all like terms are near each other so the math is easier.}$$

When rearranging you have to move the operation to the left of the term.

$$2x+10x-3x-1-3=15 \quad \leftarrow \text{combine like terms,}$$

$$12x-3x-4=15$$

$$9x-4=15$$

\leftarrow use inverse operations to solve for x .

$$\frac{9x}{9} = \frac{19}{9}$$

$$x = 2\frac{1}{9}$$

$$\#5 \quad 5x+4-3(2x-1)=8-(7x-1)+x$$

$$5x+4-6x+3=8-7x+1+x \quad \leftarrow \text{combine like terms}$$

$$-x+7=9-6x$$

$$5x+7=9 \quad \text{use inverse operations}$$

$$\frac{5x}{5} = \frac{2}{5}$$

$$x = \frac{2}{5} \text{ or } 0.4$$